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ABSTRACT

The paper describes a computer bulletin board program operated by physically handicapped high school students. Through the bulletin board system, resource people have been contacted, students' written communication and interpersonal relationships have been strengthened, and professional contact has been strengthened. Administrative implications for utilizing such a technology in a school setting include inservice needs and funding sources. Solutions to such problems as frustrating software programs, prohibitive expenses in equipment and adaptive peripherals, and slow response time by students are offered. (CL)

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TELECOMMUNICATIONS: A NEW HORIZON FOR THE HANDICAPPED

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OVERVIEW OF TELECOMMUNICATION - WHAT IT IS.

Telecommunication is one of the most popular computer applications. By connecting your computer to a modem (through a phone line) and then dialing, you can access commercial services or local boards. Appropriate communications software and hardware insures easy access to public boards, private boards and commercial services.

The scope of telecommunications has expanded dramatically. Telenet, Compuserve, The Source and others offer many services beyond information retrieval and electronic mail. You can post a "letter" in seconds, look up a particular topic in an electronic encyclopedia, get the latest news from the wire services, look at stock prices, make airline reservations, or shop at home. Utilizing other services, you can bank, take college courses, or play an electronic game. With the capability for online conferences and "chats", lasting friendships can be made even though two people may never see each other.

In short, telecommunications is an exciting computer application directly impacting our society. We have sited only a few applications. The field is expanding and changing rapidly. According to the U.S. Commerce Department 50 million Americans will be using online services by 1995.

One popular application is twenty-four hour home shopping. Online shopping offers a variety of name brand products, usually at a discount. Examples of some of the products offered are appliances, electronic equipment, cameras, typewriters, household furnishings, sporting goods and much more. Shopping involves a few seconds to get "online". You can look at what is available, make your selection, and purchase items by charging the order to your credit card. Your purchase is then mailed to you.

Online banking is another feature of telecommunications. Nearly all banking services are available through your computer and modem. You can inquire about your account, pay bills, transfer funds, and receive travelers checks. Security for banking is provided by passwords and user codes.

Electronic learning is rapidly expanding. Corporations, colleges, and universities are becoming involved. This is an area of promise for physically handicapped students. Time and distance are no longer restrictions to a disabled person pursuing a higher educational degree.

Recently, several colleges and universities have begun to pursue online education through Telelearning. At present they include the University of Nebraska, Ohio University, San Diego State University, the University of Wisconsin, American Open University of the New York Institute of Technology, DeAnza College of Cupertino, California, and Central New England College in Worcester, Massachusetts.

Typically, each school develops its courses, then forwards them to Telelearning to be incorporated in the online network. Courses offered by participating universitites and colleges can lead to BA or MBA degrees. You can also take seminars and special interest classes. Credits are received from the participating school.

WHAT IT OFFERS:

Special educators have the responsibility to prepare students for independent living in an increasingly technological world. Students graduating now are potential members of the work force until the year 2031. We feel that now is the time to prepare physically handicapped students to take advantage of this technology. They can be acquiring skills which will enable them to independently pursue job training, advanced education and greater independence.

Computer related job opportunities are one of the fastest growing segments of the job market. Examples of computer related jobs are as follows:

1. Programming at home (major electronic manufacturer)
2. Editing/proofing (local newspaper)
3. Consulting
4. Other types:
   a. Online accounting
   b. Tax preparation
   c. Information rearch specialist
   d. Technical writing
   e. Desk top publishing
   f. Mailing/clipping services
   g. Systems analysist
   h. Almost any computer related job which could be done remotely

Because of telecommunications, many of these jobs will be able to be performed at a location other than the office; namely, home. It will be possible through telecommunications to make use of capable minds often restricted in non-compliant bodies.

Case Study:

At Mesa High we have had access to telecommunications for more than three years. For the past two years the physically handicapped class has operated a computer bulletin board.

The Bulletin Board System (BBS) has been a valuable in contacting resource people. Many of the people who have assisted the program were initially contacted through help requests posted on local BBS'S. One parent hired an attendant for her child after "chatting" with him on the BBS. We have received two donated computers through BBS generated contacts.

In the academic area non oral students have been motivated in written communication by the mailbag feature of local bulletin boards. Computer pen pals have expanded the often limited social contacts of our PH students. In one instance a BBS pen pal blossomed into a dating relationship between a non oral PH student and another regular education student. In contrast, a student who was disappointed at not receiving mail was found sending himself messages.

The BBS has allowed contact between the high school PH program and junior high PH program. Therapists and teachers have used the mailbag feature to encourage students to communicate in personal and academic areas. At present, there are about 200 school and public users of our system. (Continued page 4)

WHAT IS NEEDED TO GET STARTED

I. Hardware and software needed.

The following is a list of approximate costs to set up a system. Choice of computer should be base upon the individual needs of your students. Any computer will support telecommunications if equipped with the appropriate hardware and software.

EQUIPMENT	COST	COMMENTS
Computer/monitor/disk drive	$ 700 - 2000	2nd disk drive + $200: color monitor + $200
*Modem - 300 baud	$ 50 - 150	1200 baud costs $250-500 - some require interface card - check with your dealer
Printer/interface card	$ 200 - 600	
Communications program	$ 0 - 150	Public Domain - Free/low cost Commercial - $50 -150 Preview before buying, look for one key commands, preview manuals for readability
Adaptive devices	Varies	
Mouthsticke	$ 5	
Adaptive firmware card	$ 350	Available from several sources, allows scanning and single switch input
Expandable keyboards	Varies	Some are programmable; direct selection or scanning
Electronic boards	$1500 and up	Scanning or direct selection - any type of switch input i.e. eye scan, voice, EMG, etc.
*Phone Lines	Cost varies	Compatible with dialing system i.e. rotary pulse or touch tone

Finally, physically handicapped students using telecommunications are looked up to as "experts" by other able-bodied students. It has greatly enhanced their mainstreaming and social opportunities. Roles are reversed when the able-bodied student is dependent on the disabled student for assistance within the computer area.

It is apparent that telecommunications and all its benefits are just as accessible to the physcially handicapped user as to the able-bodied user. More importantly, telecommunications gives the physically handicapped user opportunities to interact with the environment that did not exist before. With a few modifications of equipment or addition of peripherals such as switches or electronic communication boards, physically handicapped persons can participate in this area.

IMPLEMENTING TECHNOLOGY IN AN EDUCATIONAL SETTING:

Administrative Implications:

In any implementation of new technology, inservice needs must be recognized and addressed. Buying a piece of hardware or software will not insure its use and is often counterproductive. The frustration involved in trying a new piece of equipment without hands on experience, is likely to have a negative effect and lead to disuse.

The optimum scenario is to allow released time for teachers to be inserviced. They are more ready and willing to commit the time when it is part of their working day. After the initial training it is important to have ongoing support available to answer the inevitable questions.

Another major consideration is funding. If the class already has a computer and printer, a modem and communications software are relatively low cost items and can be ordered using usual district procedures. When you're looking at setting up the whole configuration, cost is a factor you will have to address.

We were able to obtain our initial hardware by writing a proposal to our Assistant Superintendent. It is important to state why the equipment is necessary, how it will be used, and instances of successful use i.e. other districts, research data, etc. in your proposal. While the benefits of using technology with handicapped students is obvious, the educational benefits must be stressed. In our case, a computer and printer is to our handicapped students what paper and pencil is to non-handicapped students. This rationale was used in our proposal.

Another alternative is to find outside funding sources. Other funding sources may be local service organizations, P.T.O. groups, private companies or grants. The Handicapped Funding Directory, Research Grant Guides, P.O. Box 357, Oceanside, N.Y. is a guide to funding sources throughout the United States. Besides a listing of corporations and foundations, it gives specific requirements for applying to the Apple Grant Program. Local users groups or computer stores may also have information on how to obtain low cost hardware and software. This is an area where creativity helps.

APPENDIX I

PROBLEMS AND SOLUTIONS

We have experienced the following problems and solutions in using telecommunications and with our BBS.

PROBLEM: Software programs: Beware of privately written "free" BBS programs. We have spent many frustrating hours attempting to operate a "buggy" public domain program. Our program required extensive programming expertise and contained little documentation. We eventually abandoned it in favor of a purchased user friendly system. Local BBS (systems operators) were the best resource in selecting an appropriate program.

SOLUTION: We have found the following features desirable in a BBS program; password capability, a user log with the capability of printing selected portions, uploading, downloading, multiple boards with security levels, time limit (this requires a clock card), single keystroke commands, electronic mail and user friendly menus. We have found it is helpful to subscribe to several computer magazines. Most magazines feature a monthly telecommunications column. Compute, A+, Family Computing, Linkup and Popular Computing are only a few of the many useful monthly magazines.

PROBLEM: High cost of equipment and adaptive peripherals. Costs range from a $5 mouthstick to a $3,000 communications board.

SOLUTION: We have found the Adaptive Firmware Card to be an easy to use scanner. The scanning takes place directly on the screen rather than on an adjacent keyboard. At approximately $350, this represents a considerable savings if interfacing with the computer is the only needed application.

PROBLEM: We could not operate the modem. Hours were spent with high school computer teacher and student "whiz kids" trying to decipher manuals written by and for the technically minded. A service call to a technician revealed our modem supported rotary pulse dialing while our school line was touch tone only.

SOLUTION: Installation of a separate, dedicated phone line, cost six months and $$$. Some new modems are compatible with both rotary pulse and touch tone - check it out before buying!

PROBLEM: Communications program supplied with modem doesn't allow saving or printing of data.

SOLUTION: Purchased software that allows data capture. Cost $125.

PROBLEM: Slow response time by students.

SOLUTION: Slow response time is minimized by our communications program which uses abbreviated key strokes for dialing and logging-on. It also has a built in text editor which allows students to prepare messages of any length while offline then send the entire file using a few key strokes. Case: A physically handicapped student prepares a letter offline in 30 minutes and sends it to her mother's home computer in less than one minute.

PROBLEM: The electric wheelchair motors caused system crashes.

SOLUTION: This was not a software problem but apparently static electricity. Spraying/wiping the area with fabic softener minimizes the problem.

PROBLEM: System crashers and anonymous obscene messages.

SOLUTION: October 1984, Link-Up "Crashproofing your BBS" by David Rolhman suggests:

1. Set up log-on codes and passwords
2. Limit the number of calls per day (clock card is needed) to three
3. Make callers disclose names, addresses, and phone number
4. Control secure software (all can be crashed)
5. Use secure software (all can be crashed)
6. Make electronic back-up daily
7. Charge membership fees
8. Check with local systems operators for names of crashers
9. Use disk recovery programs

APPENDIX II

RESOURCES

In addition to the items previously mentioned for telecommunicaions, BBS software is necessary. There are several commercial programs available. The following are for Apple/Franklin boards. Commercial programs are available for other brands of computers.

ABBS Version 4.0
Software Sorcery
7927 Jones Beach, Suite 400
McLean, VA 22102

GBBS II
System Version 1.7
Micro Data Products
5739 S. Olathe Court
Aurora, CO 80015
(303) 680-9292 modem (303) 699-1161 Voice

NET-Works
Nick Namio
4877 Martin Road
Newburgh, Ind. 47630

BULLETIN BOARDS - EXAMPLES

Special Net -
National Association of State Directors of Special Education
2021 K. Street, NW, Suite 315
Washington, D.C. 20006
202-296-1800 - See Appendix II

Hex
11523 Charlton Drive
Silver Spring, MO 20902
301-593-7033 Computer
301-681-7372 Voice

Mesa High Jackrabbits
call 602-926-1325

Compuserve
Starter Pack available from local software vendor

The Source
1616 Anderson Road
McLean, VA 22102
703-734-7500

Hundreds of other bulletin boards both commercial and public can be found in the directories listed on page 8.

BUYERS GUIDES OR DIRECTORIES

The addresses and costs are listed below:

The Buyers Guide to Modems and Communications Software
Teny C. Silveria, Sanjiva K. Nath, Edward Hogg,
Tab Books

Omni On Line Database Directory
Mae Millar Publishing Co.
866 Third Ave.
New York, NY 10022
ISBN: 0-02-079910-1

The Computer Phone Book
New American Library, Inc.
1633 Broadway
New York, NY 10019
ISBN:0-452-25446-9

ELECTRONIC UNIVERSITIES

Receiving college credit via telecommunications is already a reality. A San Francisco firm, Telelearning, offers over 170 courses. Students purchase a knowledge module containing modem and communication software and then receive a course catalog. Costs vary from $8 for a seminar to $275 for a 3 hour graduate class plus. Call 800-20-Learn or in California call 800-44-Learn.

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Bartime, Jim, "Should You Try Banking By Computer?", Personal Computing, Vol. 9, Number 11, Nov. 1985, pg. 61

"Credit Union Consortium Proves Successful", Online Today, Vol.4, Number 12, pg. 27.

Darling, Sharon, "The Electronic University", Compute, Vol. 7, Number 9, Sept. 1985, pg. 30

Ferraini, Elizabeth, "On the Menu," Linkup, March 1986, pp 5 & 27

Gelman, Joe, "Trouble shooting - How to Avoid the Hassles of Telecomputing," Family Computing, June 1985, pp. 18-21

Jarnschigg, John, "The Conference Cafe - Teleconferenceing is the Nicest Way to Hold a Meeting, Talk it Over, Get Together!", Family Computing, June 1985, pp. 20-22

THE JOURNAL viz, Telecommunicatons Issue, Number 8, April, 1985

Kortum, Sarah, "A Man, A Woman, and A Modem," Family Computing, November, 1984, pp 24-28

Kruger, Anne, "Telecomputing - Exploring On Line Data Bases," Family Computing, Sept. 1985, pp. 14-16.

Levitan, Arlan, "In Pursuit of Lower Phone Bills, Compute!", Dec 1985, pg. 129.

Levitan, Arian. "Telecomputing Today," Compute, April 1985, pp 95,98

Levitan, Orlan R., "Telecomputing Today: Saving Money with E-Mail", Compute, Vol. 7 Number 7, July 1985, pg. 88

Lockwood, Russ, "Telecommunications", At, Vol. 3, Issue 10, Oct. 1985, pg. 103

Lockwood, Russ, "Tracking the Affordable Home Service," A+, April 1985, pp. 53-56

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Nibble Magazine, March, 1984, pp 110-111

Morabito, Margaret, "Homelink," Linkup, March 1986, pp 10 & 23

Moss, Carol, "The Electronic University" Volume 1 #3
Link-Up, Sept. 1984

Pantiel, Mindy and Becky Peterson.
"Computer Jobs: Where, What, How Much."
Family Computing, April, 1984, p. 49

Sims, Robert. "Home Telecommunications,"
Computers Gazette, May, 1984, pp 95-96

Schulman, Roger. "Tele Learning-The Computer Brings the Classroom Home,"
Family Computing, Sept. 1984 Volumne 2 #9

Slatta, Richard, "Telecomputing - Telecommunications Books - On Line Tour Guide," Family Computing, Aug. 1985, pp. 16-18

Springer, P. Gregory. "Choosing Your First Bulletin Board,"
Family Computing, Aug. 1984, pp 31-32

Sullivan, Nick. "Buyers Guide to Modems,"
Family Computing, Jan. 1986, pp 46-49

Sullivan, Nick, "Get a New Kind of Charge with Your Modem and Credit Card," Family Computing, Feb 1986, pp 14-16

Sullivan, Nick. "Telecomputing,"
Family Computing, Dec. 1985, pp 19, 23

"T is for Telecommunications,"
Popular Computing, July 1984, pp 105-163

Taber, Florence. "Computerized Bulleting Boards,"
Microcomputers in Special Education, p 69

"Teletellers, Money, Modems,"
Softalk, March 1984, pp 83-84

Wollman, Jane. "A No-Hassle Way to Shop?"
Family Computing, Dec. 1983, pp 55-57

APPENDIX III

SpecialNet BULLETIN BOARDS

Following is a current list of *SpecialNet* Bulletin Boards and the *SpecialNet* username of the manager for each of the boards.

BULLETIN BOARD	MANAGER'S USER NAME	MANAGER'S NAME
ASHA.UPDATE	ASHA	Stan Dublinske
ASSESSMENT	NSMII	Linda Gibbs
ASSISTIVEDEVICE	PRC	Carol Vagnini
BILINGUAL	UTA.SE	Louesa Polyzoi
CEC.NEWS	CEC.RESTON	Lynn Smarte
CHAIN	OHCHAIN	Margaret Burley
COMPUTER	TURNKEY	Alfred J. Morin
CONFERENCE	NSMII	Linda Gibbs
CONSULTANT	NSMII	Linda Gibbs
C.SET	AZSTATE	JoLene Ralston
CSPD	COUNTERPOINT	Judy Smith-Davis
DEAFNESS	NTID.UR	Ken Nash & Michael Wech
EARLYCHILDHOOD	UOFI	Dale Gentry
EMPLOYMENT	NSMII	Linda Gibbs
EXCHANGE	NSMII	Linda Gibbs
FEDERAL	NASDSE	William Schipper & Sharon Walsh
GIFTED	COUNTERPOINT	Gayle H. Gear (As of 7/15/85)
LINC.UP	LINC	Chuck Lynd
LITIGATION	RIGHT.TO.ED	Linda O'Connor
MARKET	NSMII	Robert McCarthy
MULTIHANDICAPPED	TRD & APT	Bob Olsen, Bruce Bull; Laurie Rovin
NAPSEC.ISSUES	NAPSEC	Susan Nelson
NARIC.REPORT	NARIC	Mary Regan
NASP	NASP.CTASP	Steve Henry & Tom Hartshorne
NCAH.NEWS	NCAH	Doug Herbert
OPINIONS	NSMII	Linda Gibbs
POLICY	NASDSE	William Schipper
PRACTICES	COUNTERPOINT	Judy Smith-Davis
PROGRAM.EVAL	MSRRC	Christy Ann Riffle
RFP	NSMII	Linda Gibbs
RURAL	ACRES	Phebe Schwartz
RURAL.RESEARCH	ACRES	Phebe Schwartz, Bonnie McGregor
SOFTWARE	MEAN	Alfred J. Morin
SPEC.PE	PROJECT.CSPDPE	Ernest Bundschuh, Shirley Crowley
TECH.LINE	TECH.CENTER	Susan Elting, Sharon Raimondi
TECH.TALK	TECH.CENTER	Susan Elting, Sharon Raimondi
TELEVISION	COUNTERPOINT	Judy Smith-Davis
TRANSITION	NET.UW	Eugene Edgar
VISION	FIMCVH	Paul J. Lewis
VOCED	MISSOURILINC	Mike Stremme

SpecialNet users can access any of the bulletin boards by typing the following at the Command? prompt:

EXAMPLE:

```
COMMAND? CHECK LITIGATION     <Press Return>
COMMAND? SCAN SINCE 5/30/85   <Press Return>
COMMAND? READ 1               <Press Return>
```